THE ISTHMIAN SHIP-RAILWAY.

THE question of a transit for ocean vessels through the American Isthmus has occupied the attention of the civilized world for the last three hundred and fifty years. The great benefits which such a work would confer upon commerce were fully recognized even in the days of Cortez, and each year since has increased its necessity. The question naturally arises, Why has this great work been so long delayed? The answer lies in the fact that the majority of mankind cling to old methods rather than adopt new ones, even when the old ones are far more expensive and less efficient. It matters not that the untried ones rest upon the most evident deductions which can be drawn from scientific research or undisputed facts. Until they are demonstrated by actual test, those who propose them are looked upon as visionary enthusiasts. The opposition to the introduction of the steam-engine, steam-loom, steam-boat, locomotive, and electric telegraph furnishes abundant evidence of the hesitancy and reluctance with which even the most intelligent communities adopt new methods.

For over forty years futile efforts were made to deepen the mouth of the Mississippi by the antiquated means of dredge-boats. When these were found inadequate, the only solution deemed possible was the still more ancient and expensive one of a canal, to be cut through the eastern bank of the river to the Gulf.

A proposition to deepen one of the mouths of the river, by concentrating the force of the stream itself upon the bar, was ridiculed and pronounced impracticable by professional gentlemen of the highest respectability, and nothing but the offer to guarantee the absolute success of the plan was sufficient to induce the government to abandon the idea of a canal. In fact, $8,000,000 with which to commence the canal was voted by one branch of Congress, after this offer was made. But it was not until

a second commission of engineers was authorized by the government to investigate the merits of the jetty system that the proposition to attempt the experiment, even at the sole cost and risk of a few private individuals, was sanctioned by the government.

At the congress of distinguished engineers from all parts of the world, assembled in Paris in 1878, at the instance of Count de Lesseps, to investigate the question of interoceanic transit across the American Isthmus, the only plan considered was that of a canal, and the decision was that the problem should be solved by a sea-level one at Panama. Its cost was estimated at twelve hundred million francs, or about two hundred and forty million dollars. Subsequently, more careful estimates reduced this amount to $168,000,000, without including interest during construction.

In a locality where, for six months in the year, the rain-fall is incessant and enormous, it is not probable that such a work can be completed in less than twenty years. But if we assume that it can be done in ten, the interest at five per centum during this time would add $84,000,000 to this estimate; making a grand total of $252,000,000.

In the last half-century, science has made such marvelous advances that, in the department of mechanics, it has placed resources within the reach of the engineer which were totally beyond his grasp before, and it is now an axiom of the profession that all things are possible, if the necessary money to execute them be provided. Therefore, a sea-level canal across the Isthmus of Panama is not an impossibility.

The immense rain-fall, and the unhealthfulness of the climate, will interpose the greatest obstacles to the work. So long as the bottom of the canal is kept above the ocean level, the engineer will require only such drainage works and pumping apparatus as are necessary to remove annually water sufficient to cover, to the depth of about thirteen feet, the entire area drained by the canal. But, knowing the average rain-fall, he will be able to provide means for its removal from his excavations. When, however, the ocean itself is tapped, as it must be in cutting the canal twenty-eight feet below its surface, ordinary methods of drainage become impossible, and the quantity of water which will probably enter through veins and fissures below the ocean level is an unknown quantity, which engineering science cannot determine in advance. Yet even this formidable difficulty may be overcome, if the additional amount of money be provided. The success which has

attended the recent subscription to this enterprise seems to prove that there are many people ready to invest their money, on condition that they get five per cent. of it back every year during the time the canal is building, as is promised by the Universal Interoceanic Canal Company. As sixty million dollars are already subscribed to start the canal, on these terms, we may fairly conclude that subsequent subscriptions will be sufficient, if judiciously used, not only to pay back five per centum of it annually, and to manage the rain-fall, but also to pump out such part of the ocean as may intrude itself into the works during construction. Annoying delays to commerce may arise from these extraordinary difficulties, but the fact that the shareholders have a five-per-cent. dividend-paying stock, tolls or no tolls, will stimulate new subscriptions until the canal is completed, or until this novel method of raising money fails.

Of the commerce which will pay the tolls of any transit route for ships across the Isthmus, three-quarters will probably be American, and as the charges will doubtless be in proportion to the cost of the works, it is a matter of prime importance to the commercial interests of the United States to secure the construction of them for the least practicable sum.

The total amount of this traffic has been estimated by the chief of the Bureau of Statistics, Mr. Nimmo, to be at present only one million six hundred and twenty-five thousand tons annually. The Panama projectors estimate it at six million tons.

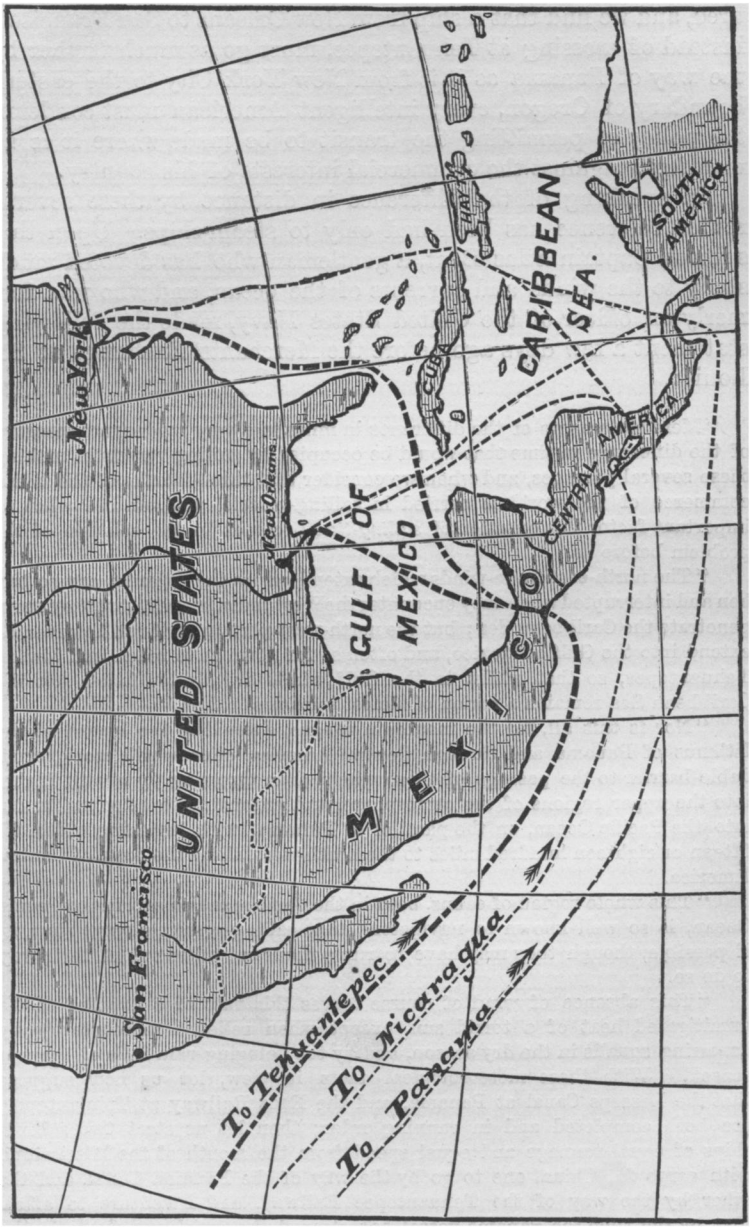
Although the estimate of Mr. Nimmo may be fairly criticised for the exclusion of a large amount of tonnage which he assumes will continue to go around the Horn to the eastward, it is probable that the real amount which the line will receive when opened will not exceed three million tons per annum. It is not likely, therefore, that the tonnage crossing the Isthmus within the next generation will support more than one line of ship-transit across it; and if we are to have moderate tolls, it is imperative that the transit be established upon that part of the Isthmus which will secure the shortest routes for our foreign and coast trade, because every additional mile which the vessel must travel will inevitably add to the cost of transporting the cargo it carries, no matter whether the increased cost results from higher tolls or a longer route.

Many persons will be surprised to learn that the isthmus which connects North and South America is as long as the dis-

tance between New York City and the mouth of the Sabine River in Texas.

Attention is here called to the accompanying chart. Panama is located near South America, and its distance from Tehuantepec, in Mexico, is one thousand two hundred and fifty statute miles. Any vessel leaving New York for San Francisco, China, or Japan must have at least that much additional distance added to her passage in the Pacific, as well as an additional distance in the Caribbean Sea, if she crosses at Panama instead of Tehuantepec, as the Isthmus lies nearly parallel with the route she must traverse. A steam-ship from New York or Charleston must travel fifteen hundred miles further to reach her destination than she would if she could cross the Mexican Isthmus. The cargo which leaves San Francisco for Europe must run the length of the whole Isthmus, and thus be delayed six or seven days more, than it would be if it crossed at Tehuantepec. Nor can these great delays be saved by the proposed canal at Nicaragua. It will be about twice as long as the Suez Canal, and steam-ships require two days in passing through the latter, although it has no locks. It is fair, therefore, to infer that thrice as much time would be consumed at Nicaragua, inasmuch as a canal there must have numerous locks. Any attempt to pass these locks rapidly will involve great danger to the lock-gates, and an injury of that kind may require weeks of delay for repairs. No advantage can, therefore, be claimed for the Nicaragua route over that of Panama, for the canal proposed at the latter place is but forty-five miles long and without locks. A passage through it could be made in one day, while at Nicaragua the crossing would probably require five or six days.

The valley of the Mississippi, so wonderfully productive, with its marvelous net-work of rivers ramifying through every portion of a territory larger than the combined areas of Germany, Austria, France, Spain, Italy, Great Britain, and the Netherlands, and capable of supporting, if peopled as densely as Holland, at least four hundred million souls, has but one natural outlet for its enormous productions—the mouth of its great river. The commerce of this immense region, if it seek a passage to the Orient or California by the Panama Canal, must be diverted out of its direct course a distance almost double the length of the Isthmus. It must travel two thousand two hundred miles further to reach those markets than by way of Tehuantepec. These distances are but faintly realized when thus stated, but when the map is meas-


New York
New Orleans
San Francisco
UNITED STATES
GULF OF MEXICO
M E X I C O
CUBA
HAYTI
CARIBBEAN SEA.
SOUTH AMERICA
CENTRAL AMERICA
To Tehuantepec
To Nicaragua
To Panama

ured, and we find that a ship from New Orleans to San Francisco, instead of crossing at Tehuantepec, must go as much farther by the way of Panama as it is from New York City to the eastern boundary of Oregon, every intelligent American must condemn the policy of permitting the transit to be made where it is so manifestly against the commercial interests of his country.

In speaking of the difference in distance by these several routes, reference has been had only to steam-ships. Upon this subject, Captain Silas Bent, a gentleman who has devoted much study to the winds and currents of the ocean, and who was formerly an officer of the United States Navy, made the following statement a few days ago before the Merchants' Exchange at St. Louis:

"Mere statements of the difference in miles is a very inadequate measure of the difference in time that would be occupied by sailing-vessels in making these several passages, and when we consider that three-fourths of the ocean commerce of the world is carried in sailing-vessels, you can see what an important factor this question of *sailing-time* becomes in the solution of the problem before us.

"The north-east trade-winds which extend across the Atlantic are so broken and interrupted when they encounter the West India Islands, that they never penetrate the Caribbean Sea; but the north-west portion of them, however, do extend into the Gulf of Mexico, and often so far down as to reach well toward Tehuantepec, so that whilst in the Gulf winds are always found, yet the Caribbean Sea remains a region of almost relentless calms.

"Nor is this all, for the mountain ranges, extending the length of the Isthmus of Panama and through Central America, offer a still more formidable barrier to the passage of these winds, thus throwing them still higher into the upper regions of the atmosphere, and extending these calms far out into the Pacific Ocean, on the parallel of Panama, with lessening width, for fifteen or eighteen hundred miles to the north-west, along the coast of Central America.

"This whole region of calms, both in the Caribbean Sea and in the Pacific Ocean, is so well known to navigators, that sailing-vessels always shun it, if possible, though they may have to run a thousand miles out of their way to do so.

"This absence of wind of course leaves this vast area exposed to the unmitigated heat of a torrid sun, except when relieved momentarily by harassing squalls in the dry season, and by the deluging rain-falls of the wet season. With these meteorological facts in view, let us now suppose that the Lesseps Canal at Panama, and the Eads Railway at Tehuantepec, are both completed and in running order; then let us start two sailing-ships of equal tonnage and equal speed from the mouth of the Mississippi, with cargo for China, one to go by the way of the Panama Canal, and the other by the way of the Tehuantepec Railway, and I venture to affirm that by the time the Panama vessel has cleared the canal and floats in the

waters of the Pacific, the Tehuantepec vessel will have scaled the Isthmus and be well on to the meridian of the Sandwich Islands; and that before the former vessel can worry through the fifteen or more hundred miles of windless ocean before her, to reach the trade-winds to the westward of Tehauntepec, the latter will have sped five thousand miles on her way across the Pacific, and be fully thirty days ahead of her adversary. For it is a fact worth mentioning here, that the strength of the north-east trade-winds in the Pacific, as well as the maximum strength of the northern portion of the great equatorial current in that ocean, are both found on or near the parallel of latitude of Tehuantepec, the former blowing with an impelling force to the westward of ten or twelve miles an hour, and the latter with a following strength of three or four miles per hour."

In considering this important question from a military point of view, the superior advantages possessed by Tehuantepec over Panama and Nicaragua will be apparent to any one who will examine the map. A few iron-clads and torpedoes placed in the narrow channel between Yucatan and Cuba, and as many more in the Florida channel, would defend the entire Gulf of Mexico against almost any naval force that could be concentrated in them; while it would be simply impossible to isolate as completely the Caribbean Sea, with ten times as many iron-clads. It would be almost impossible for the United States to hold the Panama or Nicaragua canal against such a naval force as either France or England, with its present navy, could bring to bear against it.

Two very important railroads are now being rapidly constructed in Mexico by American companies: one extending from Texas, and the other from New Mexico, to the city of Mexico. A very superior railroad is already built from the city of Mexico to Vera Cruz. This latter city is only one hundred and nine miles from the mouth of the Coatzacoalco River, which will be the entrance to the ship-railway. A railroad from Vera Cruz toward the mouth of the Coatzacoalco has already been commenced. By these railroad lines, a very large body of troops could be rapidly concentrated in Tehuantepec to protect the works against a hostile land attack. The gulf end of the railway would be at least thirty miles in a direct line from the gulf coast, and the Pacific terminus of the road would be fourteen or fifteen miles from the Pacific coast. Both ends of the road would, therefore, be beyond the reach of the guns of an enemy's ship, unless it entered through the Coatzacoalco River or the jettied channel of the lagoon on the Pacific side—both of which channels could be easily and cheaply defended by torpedoes. In addition to this,

the ship-railway would be located on the territory of a powerful and friendly republic, whose history has not only proved its aversion to European domination, but has shown its power to deal successfully with an invasion of its territory. We have, therefore, the assurance that Mexico itself is able to protect, very effectually, the ship-railway, without the aid of any other power. On the other hand, we have no assurance that the interests of the small and much less powerful states of Nicaragua and Columbia would not be enlisted in favor of European intervention. It is not many years since a convention was concluded between France, England, and Nicaragua, by which the integrity of Nicaragua was guaranteed by its two powerful allies.

It would be idle to undertake to defend a canal at Nicaragua or at Panama with American troops, because of the difficulty of sending them overland to either point, and of maintaining them in such an unhealthy region, and so far from any available base of supplies. This difficulty would be greatly enhanced if it should happen that the citizens of either country favored such European intervention as the United States would feel compelled to oppose.

If *a canal* were equally practicable at Tehuantepec, no intelligent American would hesitate a moment to give it the preference over any other route. But, are the immense natural advantages of that location to be disregarded because a canal cannot be used, when the most eminent ship-builders and many of the ablest engineers in the world do not hesitate to declare in print, over their own signatures, that a ship-railway is not only practicable, but that it is really better than a canal?—that it is much cheaper to build; that it can be more quickly constructed; that the largest ships can be transported much more rapidly, and with equal safety on it; that it can be more easily enlarged to meet the future demands of commerce, and that its maintenance will be less costly?

But say some, "You cannot transport ships by rail without straining them. It is impossible to take a laden ship out and put it upon a dry-dock without removing her cargo. It will burst her sides out, and she will be bent and strained while in transit over the railway." These objections are advanced by men who have not studied the principles of ship-building or engineering, and who are therefore not competent to form a correct judgment

on the subject. The captain of an ocean steamer, and the engineer who plans and builds her, follow professions that are widely different. The engineer would be as unfitted to command and navigate the ship, as the captain would be to deal with the mathematical processes by which the materials in her hull and engines are proportioned to bear the various strains which each particular part must resist. Men who are competent to investigate and determine the infinite variety of strains which the boilers, engines, propeller, shaft, and various parts of the ship must bear, while the vessel is plunging, twisting, and bending under the fury of a storm, are certainly competent to pronounce upon the practicability of transporting her upon a well-built railway. There is no lack of testimony from men of this kind in favor of it. But the transportation of vessels upon a railway is by no means an untried experiment, and therefore it is not wholly dependent upon the opinion of experts.

Within four miles of Washington, a railway, composed of four rails, transports canal-boats from the Potomac River to a canal which is about thirty feet above it. The boats are conveyed over the railway several hundred feet to the other level. The total load each trip weighs about three hundred tons. The canal-boats are carried in a tank of water* about seven feet deep, yet the water does not burst out the sides of the tank, although there are no beams across the top of it to tie its sides together. Ships have their sides strongly tied together by their deck-beams, and they are rarely more than seven feet between decks. There is no cargo which will tend to burst out the sides of a ship more than that of grain in bulk, and grain is not as heavy as water. Consequently the ship's sides have the advantage of the canal-boat tank in the fact that they are strongly bound together by the deck-beams, whilst the tank has nothing at all comparable in strength to sustain its sides. There is no sea-worthy iron or wooden vessel afloat upon the ocean whose sides are not sufficiently strong to resist bursting, if the vessel were put in a dry-dock and filled with water to her main deck, and this would be a much greater internal pressure than any cargo could create.

If it be supposed that the ship will be bent in the direction of

* I do not approve of the plan of carrying vessels in tanks of water, over long distances, as it involves the cost of carrying a great weight without compensation.

her length, we have only to inquire into the pressure which the vessel and car impose upon the road-bed to have such fear banished at once. Trains of one thousand tons weight are not uncommon upon ordinary railways. I have been assured by a gentleman of great experience in railway management that he has seen a freight-engine, of the Mogul pattern, haul one train of eleven hundred tons on the Illinois Central Railroad. If six such trains were placed side by side, they would represent the weight of one of the very largest steamers when loaded. There would be no fear of the ground giving way beneath these six trains, although a large portion of the earth under them would sustain no portion of the load when at rest, because each end of an American railway car rests on a truck with four wheels, while fifteen or twenty feet of the road under the middle of each car has no load whatever upon it. No wheels are placed under this part, as they would interfere with the passage of the car around curves; but as the ship-railway will be absolutely straight, the wheels can be placed as close together under the ship as they are at each end of the car.

In the ship-railway cars the wheels will be two feet in diameter, and will be placed three feet apart on the rails. It must be evident that if we place as many wheels under the ship as are required in the six railway trains just referred to, the ship may be of a weight equal to them, without imposing any more pressure upon the rails at each point of contact than is imposed upon the wheels supporting the six railway trains. The pressure of the driving-wheels of a locomotive at rest is about six and one-half tons for each wheel. The pressure on the ship-railway will be limited to five tons per wheel. The rails and wheels will, however, be quite capable of bearing twenty tons on each wheel, and, to provide for any inequality in the rails, steel springs will be placed over each wheel. As each one of these wheels will have an independent axle, and be disconnected from any other, the derailment of the car will be almost impossible. An additional safeguard against derailment will be found in the slow rate of speed (eight or ten miles an hour), and in the fact that each division of the road will be straight. Turn-tables, long enough to carry the ship and car, will be placed where a change of direction in the road becomes necessary. By this means the car and its burden may be turned to correspond with another straight reach of track. From the surveys thus far

made, it is not anticipated that more than three of such turn-tables will be required on the entire line of road.

A misapprehension exists regarding the danger of bending the ship where a change of grade becomes necessary. At Tehuantepec, one foot in one hundred will be the maximum. From a horizontal plane to this grade, the change can be made so gradual in the distance of one mile, that a ship four hundred feet long would not be bent one inch out of a straight line if it conformed to the vertical curvature of the track. But the springs under the car will prevent even this little bending.

It is not generally known that all materials used in the construction of ships are elastic, and that large iron vessels bend and twist during storms to an extent that seems impossible. No iron bridges are so constructed but that the elasticity of the iron permits them to bend under the weight of an ordinary freight train. Spans of four hundred feet when tested with heavy loads usually bend from four to five inches, and a ship of that length will bend quite as much without injury. Wood being more elastic than iron will bend much more. Those who have crossed the Atlantic have not failed to hear the creaking of the cabins during storms. This could not occur if the hull did not bend and twist to some extent. The fear of a ship being strained while in transit is founded in a want of knowledge of the strength of ships, and of the capability of the earth to sustain the load. Fifteen hundred wheels exerting a pressure of five tons each will create seven thousand five hundred tons pressure. This weight distributed on twelve rails would require one hundred and twenty-five wheels on each rail. The outer rails would be about forty feet apart, hence the ground covered by the wheels would be equal to a space three hundred and seventy-five by forty feet, or fifteen hundred square feet. The pressure, therefore, would be only one-half of a ton to each square foot of earth.

The question has been asked, "How can you equalize this pressure upon the various wheels?" The car which carries the ship will be made of plate-iron cross-girders of sufficient depth and strength, and of such number as are needed to carry the entire load, even if each girder had no support between the two outside rails of the track; therefore the weight from the keel to each side can be distributed over all the rails of the system. In distributing the pressure lengthwise, it should be borne in mind that the ship possesses enormous strength to resist bending, and,

beside this, that she cannot bend in the direction of her length on the car, unless the earth gives way under her, hence no longitudinal strength in the car itself is really necessary. The midship section, being much the heaviest, would produce a greater pressure per foot than an equal length of the ends, but this section is balanced by leaving a certain portion of the ends unsupported. The car which would carry a ship four hundred and fifty feet long would not be over three hundred and fifty feet, hence fifty or sixty feet of each end of the ship would project over the ends of the car. In this way, the wheels at the ends of the car would be made to bear as much as those in the middle. In floating-dock, vessels usually have a very considerable portion of their ends without support. Their sides, at the bow and stern, rise directly from the keel, and give great strength to these parts. An intelligent and reliable correspondent wrote to me recently that he had witnessed the long and tedious launching of the Great Eastern. She was parallel to the river, and the ways only occupied one hundred and fifty feet of the middle of the ship, leaving two hundred and sixty-four feet of each end without support.

It is not important that each wheel should bear exactly as much as its neighbor. Although five tons would be the maximum average load, each one would be tested to bear at least four times as much, and in practice it might occasionally be required, by inequalities in the road, or even in the distribution of the load, to bear twice as much. The car-wheels on railways are frequently compelled to bear three or four times as much, while the trains are moving at high speed, as they do when at rest.

Let us now compare this pressure of half a ton per square foot, imposed by a large vessel on the road-bed, with that which we see applied every day to the earth. A man compelled to use crutches carries his whole weight on the ends of them. On a hard dirt road they leave scarcely any sign of the pressure. Assuming his weight to be one hundred and eighty pounds, and the end of each crutch to be equal to two square inches, his weight will be carried upon one thirty-sixth part of a square foot, which is equivalent to six thousand four hundred and eighty pounds pressure to the square foot, or about six and a half times the pressure that would be brought to bear by the weight of one of the largest class of steamers. A horse, when trotting, carries the weight of himself and rider on but two of his feet at

each step; yet on a dry dirt road his shoes hardly leave their imprint. The area of each shoe will not exceed twelve square inches. If the horse and rider weigh twelve hundred pounds, the pressure would be more than seven times as great as that which the earth would sustain under the ship-railway, with its heaviest load. A brick wall, only one story high, presses the earth more heavily per square foot than the heaviest ship could on the ship-railway. When ships are launched, the two narrow launching-ways which carry them press the earth with from three to five times as much force per square foot without settling.

It is a mistake to suppose that ships are not sometimes taken out upon dry-docks with full loads in them. One of the largest German steamers, fully loaded, was taken out within the last twelve months and put upon a dry-dock in New York without the slightest injury, and vessels with their cargoes are frequently taken out on the docks in England and elsewhere.

The bill before Congress in aid of the ship-railway requires that a guarantee of six per centum dividends on fifty million dollars, or two-thirds of the capital stock of the company, shall be made by the United States for fifteen years, the guarantee not to include the principal. It is only to take effect after the entire practicability of the plan is proven. Ten miles of road, and the necessary terminal works to take a loaded ship out, are to be first built, and then tested by transporting the ship and her load over the ten miles of railway at a speed of at least six miles per hour, and replacing her in the water again without injury to the ship, the railway, or the terminal works. Even when this is done, the guarantee is only to attach for five million dollars. As each additional section is completed and tested in this way, the guarantee for a proportional amount is to attach. As each ten millions of stock is guaranteed, the severity of the test is increased. For the first ten millions, the weight of ship and cargo is to be two thousand tons. The next test will be twenty-five hundred; then three thousand; then thirty-five hundred; and finally four thousand tons. In consideration of this guarantee the company agrees: *first:* to transport, for ninety-nine years, the ships, troops, property, and mails of the United States free. *Second:* to carry no other war-vessels, or contraband of war of any nation at war with the United States. *Third:* that all net receipts in excess of a sum sufficient to pay six per cent. dividends shall be paid to the United States, to refund any

advances they may have made on account of the guarantee. *Fourth:* to give the United States the right to reduce or increase the tolls at her pleasure, provided the reduction shall not prevent the earning of eight per centum dividends. *Fifth:* to give her the right to discriminate in favor of American and Mexican commerce when fixing the tolls.

To avoid any question as to what are net receipts, the company agrees that one-half of the gross receipts shall be deemed sufficient to pay operating and extraordinary expenses, repairs, etc., so that when the total receipts are six million dollars per annum, the United States will incur no liability under its guarantee.

The grant from Mexico gives to the company the right to offer these advantages to any other foreign government that will aid the enterprise with money or guarantees.

The popular feeling in the United States has unquestionably, until quite recently, been favorable to Nicaragua, and many arguments have been advanced in its behalf. Every one of these is doubly powerful when applied to the Isthmus of Tehuantepec. The whole question between these two locations must depend on the answer to this inquiry, namely: "Is the ship-railway practicable?" No engineer, so far as I know, has yet publicly expressed any doubt of it. On the contrary, some of the ablest engineers and ship-builders in the world have expressed implicit confidence in its practicability.

If we consider the healthfulness of the two isthmuses, there can be no question as to the superiority of Tehuantepec. If we look at the shortness of the routes, Tehuantepec still has the advantage. When we compare the canal and its numerous locks and the delays incident to their use, to say nothing of the danger of their derangement, with the certainty and celerity of transit by railway, the superiority of Tehuantepec is no less marked. It is claimed that the Nicaragua Canal will complete our coast line between the Atlantic and Pacific, but how much more secure and complete will it become, if we exclude from it a foreign coast line on the Isthmus as long as that which extends from the capes of Florida to Newfoundland! This will be done by the ship-railway at Tehuantepec.

Much has been said and written of the importance of cultivating more intimate commercial relations with Mexico, and no thoughtful merchant or statesman can fail to concede it. In the

first place, she has a government fashioned after the plan of our own, and we should on this account, if on no other, be bound to her by the strongest sympathy. Her soil is wondrously fertile and productive. Hidden in her mountains, within the easy reach of enterprise, lie stores of gold and silver in fabulous amount. Many articles of commerce which we require, but cannot produce, are brought to great perfection there, and her people require innumerable manufactured articles, commodities, and productions which we could supply to them, with great profit to us and advantage to them. There is, indeed, no good reason why we should not enjoy almost all of her commerce.

There can be no doubt that the construction of the ship-railway at Tehuantepec will greatly stimulate intercourse between us, and it must bind the two nations more firmly together, socially, politically, and commercially.

I will not, at this time, dwell upon this important topic, but will simply refer to the following table, taken from official records, showing the commerce with the various nations therein specified:

British India	$423,000,000
Australia	375,819,000
China	198,000,000
Hong-Kong	112,000,000
Peru	75,000,000
New Zealand	71,782,000
Chili	58,000,000
Japan	55,230,000
Philippine Islands	34,763,000
Tasmania	14,835,000
Hawaiian Islands	7,524,000
	$1,425,953,000

Of this vast commerce, the United States enjoys but four per cent., and even in this trifling percentage the Mississippi valley is debarred by the Isthmus from all participation.

Our sister republic of Mexico has been most liberal in concessions in aid of the ship-railway. Realizing the great benefits that will inevitably follow its completion, she has given everything in her power to make it a success. *First.* She exempts all property of the company and its capital stock from taxation during the entire period of ninety-nine years. *Second.* She permits the importation, during the like period, of everything

necessary for the construction and operation of the railway. *Third.* She gives a right of way across the Isthmus a half mile in width. *Fourth.* She donates to the company a million acres of the public domain. *Fifth.* She exempts all the money required to pay debts and dividends of the company abroad, from the present export duty of six per centum; and *Sixth.* She agrees to protect the works with her army and navy, at her own expense. But this is not all. Anxious to cultivate more intimate relations with us, Mexico offers to the United States government rights and privileges greater than any ever before extended by her to either government or individual. She says to the United States: You may regulate, at your will, the tolls of this company. You may reserve the right to discriminate in favor of your own commerce. You may accept an assignment of the revenues of the road, and our courts will protect you in its enjoyment. Come, join us in consummating the most important work of modern times—a work which, when completed, will bring manifold blessings to you and to us. What answer will the United States give to this urgent invitation? It comes from a nation which, but recently emerging from the throes of foreign invasion and domestic revolution, has, through the wisdom of her rulers, established herself upon a firm basis, and promises in time to rank high among the nations. Just now her treasury is depleted, and the masses of her people are poor, although there is probably no equal area of territory on the earth so rich in undeveloped wealth. But her present poverty has not prevented the exercise of a statesmanlike liberality in dealing with this great question. Her invitation is made to the foremost nation on the earth; one whose credit is second to none, and whose wealth and resources are illimitable. She offers an opportunity to solve the great problem of centuries, and to assert the Monroe, or rather the American, doctrine, not by idle declaration, nor by force of arms, but in a way to command the respect of the world. The United States to-day enjoys but five per cent. of her entire foreign trade: ninety-five per cent. of that valuable and growing commerce is controlled by foreign nations. Will the United States reverse these figures? or, will she disregard the overtures of Mexico, decline her liberality and reject her commerce by refusing to join with her in opening, for mutual benefit, the grandest commercial highway ever projected?

JAS. B. EADS.